

CABLINE®-VSF

Part No. Plug: 3049-0**# (SHELL Only) , 20645-0**T-01 (SHELL ASS'Y)

Receptacle: 20455-0**E-※2※, 20455-0**E-※9※

Product Specification

Qualification Test Report No. TR-14095 (20455-0**E-※2※)

Qualification Test Report No. TR-17048 (20455-0**E-※9※)

10	S22099	March 8, 2022	E.Tanaka	T.Onishi	H.Ikari
9	S21657	December 2, 2021	M.Muro	-	H.Ikari
8	S18665	November 1, 2018	Y.Sasa	T.Masunaga	H.Ikari
7	S18329	June 5, 2018	Y.Sasa	T.Masunaga	H.Ikari
Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Scope

This Product Specification defines the test conditions and the performances of the CABLINE-VSF Connector, a shield FPC-to-board connector of 0.5mm contact pitch.

2. Product Name and Parts No.

2.1 Product Name

CABLINE-VSF

2.2 Parts No

PLUG SHELL Only : 3049-0**#
PLUG SHELL ASS'Y (with LOCK BAR) : 20645-0**T-01

2.3 Applicable RECE Connector

CABLINE-VS RECE. : 20455-0**E-※2※
CABLINE-VS RECE. (TYPE-U) : 20455-0**E-※9※

2.4 Applicable FPC

Shielded FPC Conductor pitch / size of thickness ... 0.5mm / 0.28^{+0.02/-0.03}mm

Thermosetting adhesive. Refer to the product drawing (DWG No. 3049 or 20645) for a detail dimension and structure.

3. Rating

3.1 Operating Conditions

Amperage: 0.3A AC/DC (per contact pin)
Voltage: 100V AC (per contact pin)
Operating temperature: 233~358K(-40℃~+85℃)
(Containing temperature rise by current)
Operating humidity: 85% max

3.2 Storage Conditions

Storage temperature: 248~333K(-25℃~+60℃)
Storage humidity: 85% max. (Non-condensing)

4. Test and Performance

Test Condition

This initial test is equal to it's at shipping condition and unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202 G.

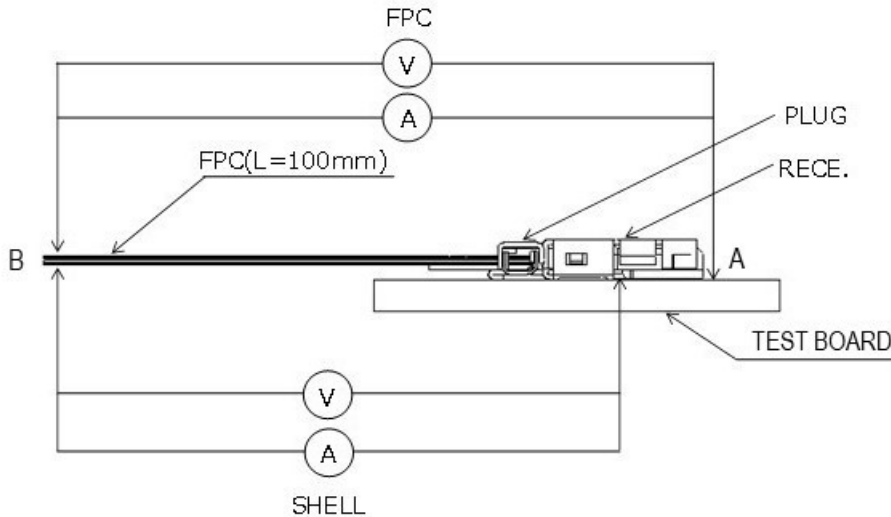
Temperature ... 288K~308K (15℃~35℃)
Pressure ... 866hPa~1066hPa (650mmHg~800mmHg)
Relative humidity ... 45~75%R.H.

4.1 Electrical Performance

1. Contact resistance

Reference standard: MIL-STD-202G, Method 307

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and then apply 20mV MAX. DC open circuit voltage and 1mA MAX. DC closed circuit current. Measure the contact resistance of signal and GROUND at the section shown in Fig.1 by the four terminal methods.



$$\text{Contact Resistance} = R_{AB} - (\text{FPC } 100\text{mm Conductor Resistance}) - (\text{Test Board Conductor Resistance})$$

Fig.1

Pass criteria: Contact ... Initial: 60 mΩ MAX. After testing: ΔR 40 mΩ MAX.
Ground contact ... Initial: 60 mΩ MAX. After testing: ΔR 40 mΩ MAX.

2. Insulation resistance

Reference standard: MIL-STD-202G, Method 302

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and then apply DC 250 V between the neighboring contact.

Pass criteria: Initial: 1000 MΩ MIN. After testing: 500 MΩ MIN.

3. Dielectric withstanding voltage

Reference standard: MIL-STD-202G, Method 301

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and then apply AC 250V(rms) between the neighboring contacts for a minute.

Pass criteria: No creeping discharge, flashover, no insulator breakdown shall occur.

4. Temperature rising

Reference standard: -

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and then apply rating current to each contact and measure temperature rise around the connector.

Pass criteria: Over ambient ΔT 30 °C MAX.

4.2 Mechanical Performance

1. Mating force and Un-mating force	
Reference standard: -	
Test conditions:	Solder the receptacle connector to the test board, then place the board and plug on push-on/pull-off machine, measure of initial and mating/unmating 30 cycles at a speed 25 ± 3 mm/min. along the mating axis.
Pass criteria:	Mating force 30 P : 24.0 N MAX. 40 P : 32.0 N MAX. Unmating force 30 P : 1.10 N MIN. 40 P : 1.40 N MIN.

2. Durability	
Reference standard: -	
Test conditions:	Solder the receptacle connector to the test board, then place the board and plug on the push-on/pull-off machine, and repeat mating and unmating 30 cycles at a speed 25 ± 3 mm/min. along the mating axis.
Pass criteria:	Contact resistance: Shall meet 4.1.1

3. Vibration	
Reference standard:	MIL-STD-202G, Method 201
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, and place them on the vibrator. Then apply the following vibration. During the testing, run 100mA DC to check electrical discontinuity. Frequency: 10Hz→55Hz→10Hz/approx. 1min. Directions: 3 mutually perpendicular direction. Total Amplitude: 1.52mm Sweep duration: 2 hours for each direction, a total of 6 hours.
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than 1µs shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

4. Shock	
Reference standard:	MIL-STD-202G, Method 213, Condition A.
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, and place them on the shock machine. Then apply the following shock. MAX.G: 50G Duration: 11msec Wave Form: Half Sinusoidal Directions: 6 mutually perpendicular direction Cycle: 3 cycles about each direction
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than 1µs shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

4.3 Environmental Performance

1. Thermal shock

Reference standard: MIL-STD-202G, Method 107, Condition A.

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.
 Temperature: 218K(-55°C),30min.→358K(85°C),30min.
 Transition time: 5min. MAX.
 No. of cycles: 5 cycles

Pass criteria: Contact resistance: Shall meet 4.1.1.

2. High temperature life

Reference standard: MIL-STD-202G, Method 108, Condition B.

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.
 Temperature: 358±2K (85±2°C)
 Duration: 250 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.

3. Humidity (Steady state)

Reference standard: MIL-STD-202G, Method 103, Condition A.

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.
 Temperature: 313±2K (40±2°C)
 Humidity: 90~95%RH
 Duration: 240 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Insulation resistance: Shall meet 4.1.2.
 Dielectric withstanding voltage: Shall meet 4.1.3.

4. Humidity (Cycling)

Reference standard: MIL-STD-202G, Method 106.

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.
 Temperature: 298[263]~338K (25[-10]~65°C)
 Humidity: 90~98%RH
 Duration: 10cycles (240hours)

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Insulation resistance: Shall meet 4.1.2.
 Dielectric withstanding voltage: Shall meet 4.1.3.

4.3 Environmental Performance

5. Salt water spray

Reference standard: MIL-STD-202 G, Method 101, Condition B.

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.
 Temperature: $308 \pm 2\text{K}$ ($35 \pm 2^\circ\text{C}$)
 Salt water density: $5 \pm 1\%$ [by weight]
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality adversely affecting the performance shall occur.

6. H₂S gas

Reference standard: -

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.
 Temperature: $313 \pm 2\text{K}$ ($40 \pm 2^\circ\text{C}$)
 Relative humidity: $80 \pm 5\%RH$
 Gas: H₂S $3 \pm 1\text{ppm}$
 Duration: 96 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality adversely affecting the performance shall occur.

4.4 Test Sequence and Specimen Quantity

Table 1 Test Sequence and Sample Quantity

Test Item	Group								
	A	B	C	D	E	F	G	H	J
Contact Resistance		2,6	1,3,5	1,3	1,3	1,5	1,5	1,3	1,3
Insulation Resistance						2,6	2,6		
D. W. Voltage						3,7	3,7		
Temperature rising	1								
Mating Force		1,5							
Un-mating Force		3,7							
Durability		4							
Vibration			2						
Shock			4						
Thermal Shock				2					
High Temperature Life					2				
Humidity (Steady State)						4			
Humidity (Cycling)							4		
Salt Water Spray								2	
H2S Gas									2
Specimen Quantity.	5 pcs.	5 pos.	5 pos.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.

※Numbers indicate sequence in which tests are performed.

5. Precautions for Handling Cable Connectors

Refer to instruction manual : HIM-13009 for the handling of CABLINE-VSF.